DOCUMENT RESUME

ED 132 622 CS 501 565

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TITLE An Experimental Study of the Effects of Message Pitch and Evaluative Meaning on Listeners' Recall.
PUB DATE Jun 76
NOTE 36p.; Paper presented at the Communication Association of the Pacific Convention (Kobe, Japan, June 1976)

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS College Students; Higher Education; *Language Research; *Listening; Listening Comprehension; *Oral Communication; *Recall (Psychological); Retention Studies; *Semantics
IDENTIFIERS *Voice Pitch

ABSTRACT

In order to establish whether voice pitch and evaluative meaning play any significant role in affecting message learning (as demonstrated by listeners' recall) at the morphemic level of communication, 48 freshman students in a basic speech program participated in this study. Through individual headsets, students listened to tapes containing an introduction, the experimental material, the recall assignment, and the conclusion. Experimental material consisted of eighteen words, chosen to ensure equal semantic representation, recorded with various inflections. Results showed that neither pitch nor evaluative meaning plays a significant role in message recall at the morphemic level of language transmission and reception. A selected bibliography and six appendixes containing material related to the study are included. (JM)

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AN EXPERIMENTAL STUDY OF THE EFFECTS OF MESSAGE PITCH AND EVALUATIVE MEANING ON LISTENERS' RECALL

by

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A Paper Presented at the
COMMUNICATION ASSOCIATION OF THE PACIFIC CONVENTION
June 1976
Kobe, Japan

as 501 565

"An Experimental Study of the Effects of Message Pitch and Evaluative Meaning on Listeners' Recall"

The human voice provides the user with the capacity to accomplish many things. The sounds produced by the vocal mechanism play a large part in the communication process. They also contribute in the conveying of emotions and attitudes. According to Bronstein and Jacoby, "there are four dimensions of sound that we can perceive: pitch, loudness, quality, and duration."[1] Of these dimensions, pitch is the one most frequently varied to express and heighten meaning in the oral communication process, and to convey innumerable attitudinal and emotional overtones.[2]

Previous research in the area of pitch and pitch usage has established the importance of this dimension in the oral communication process. In their book, Developing Vocal Skills, Hanley and Thurman declare that, "one of the major virtues of pitch control, then, is subtlety of communication, extending beyond the informational values inherent in the language we use."[3] Speech scholars have shown pitch to be a determining factor in the success or failure of the vocal message. Samovar and Mills concur, and add that changes in pitch

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[1]Arthur F. Bronstein and Beatrice F. Jacoby, Your Speech and Voice (New York: Random House, Inc., 1967) p.219.

[2]Bronstein and Jacoby, p.46.

[3]Theodore D. Hanley and Wayne L. Thurman, Developing Vocal Skills (New York: Holt, Rinehart and Winston, Inc., 1962) p. 184.

level during the course of a communication provide the speaker with one of the most effective means of gaining attention and imparting meaning to the audience.[4] Abernathy, in Fundamentals of Speech Communication, states, "Flexibility of pitch not only shows meaning, but also makes for brighter, more interest sustaining speech."[5]

A synthesis of what speech scholars say about the use and importance of pitch is characterized by the stressing of the significance pitch plays in the decoding of message meaning. The studies investigating pitch as a message variable deal basically with listeners' attitude toward the pitch used in the message. Typically,[6] the investigators answer questions like, "Was the speaker easy to listen to?." For example, Lewis and Tiffin report that, "in a study of six males, who had a wide range of speaking ability, the speaker whose voice was rated best used the highest average pitch levels."[7]

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[4]Larry A. Samovar and Jack Mills, Oral Communication Message and Response (Dubuque, Iowa: Wm. C. Brown Company Publishers, 1967) p. 64.

[5]Elton Abernathy, Fundamentals of Speech Communication (Dubuque, Iowa: Wm. C. Brown Company Publishers, 1964) p. 237.

[6]Representative studies include Alan H. Monroe, "Experimental Studies in the Measurement and Analysis of Audience Reactions to Student Speakers" (diss., Northwestern University, 1937); F. Allport and D. Katz, Student Attitudes (New York: Craftsman Press, 1931); E. Mary Huyck and Kenneth D. A. Allen, "Diaphragmatic Action of Good and Poor Speaking Voices," Speech Monographs, IV (1937), pp. 101-110; Grant Fairbanks and Lemar Witt Huaglin, "An Experimental Study of the Durational Characteristics of the Voice During the Expression of Emotion, " Speech Monographs, VIII (1941), pp. 85-90.

[7]Don Lewis and J. Tiffin, "A Psychophysical Study of Individual Differences in Speaking Ability", Archives of Speech, Vol. I (1934) pp. 43-60.

Although previous researchers were aware of the importance pitch plays in meaning and its subheadings, learning and recall, their studies were confined to psychophysical interests.

The study of the relationship of pitch to meaning, specifically recall, has been neglected. Because pitch has been established in its importance to vocal communication, and vocal communication has been established in its importance to message reception and learning; the relationship pitch plays in the learning process, as demonstrated by listeners' recall, should be explored.

Meaning appears to be the basic concern of the speaker. To achieve the goal of evoking meaning in listeners, the speaker utilizes all the variations of sound performance possible. "Nothing is probably more detrimental to the effective use of the voice in speech, than the absence of expressive pitch changes."[8] Without the use of pitch in vocal communication, the speaker drastically reduces the chances for the meaning to be evoked.

The meaning of the communication, when decoded, will constitute part of the learning process regardless of the message. Even in the emotional speaker, the use of pitch variations aid the listener in perceiving the thought content of the speech.[9] If the speaker masters the use of pitch factors, he is able to make his meaning more obvious

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[8]George W. Fluharty and Harold R. Ross, Public Speaking (New York: Barnes and Noble, Inc., 1966) p. 170.

[9]Alan H. Monroe, Principles and Types of Speech (Chicago: Scott, Foresman and Company, 1962) p. 96.

and clearer. The evaluative meaning that a listener places on a word before it is spoken can affect the learning process.[10]

Because of the established importance of message pitch and evaluative meaning, and their effect on listeners' recall, the following study was designed to establish if pitch and meaning play any significant role in affecting message learning, as demonstrated by listeners' recall, at the morphemic level of communication. A morpheme may be defined as the smallest linguistic segment that carries specific meaning.[11] The morphemic level is one link in the chain of phonological structure. The first link in the chain is the phonemic level. At this level groups of sounds that are functionally equivalent are grouped together. Next in the chain is the morphemic level which has been described above. The next link in the chain is the syntactical level. At the syntactical level two or more morphemes (words) are grouped together to form meaningful phrases or sentences. The last link in the chain is the discoursive level. It is at this level sentences and paragraphs are organized into speeches.

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[10]For a discussion of the relationship between evaluative word meaning and learning see William J. Jordan, "A Psychological Explication of Aristotle's Concept of Metaphor" (diss., Wayne State University, 1969). Studies surveyed in this discussion include B.H. Cohen, "Role of Awareness in Meaning Established by Classical Conditioning," Journal of Experimental Psychology, LXVII (1964), pp. 373-378; J.P. Das and P.C. Nanda, "Mediated Transfer of Attitudes", Journal of Abnormal and Social Psychology, LXVI (1963), pp. 12-16; F.J. DiVista and D.O. Stover, "The Semantic Mediation of Evaluative Meaning", Journal of Experimental Psychology, XVIII (1964), pp. 146-155; H.R. Pollio, "Word Association as a Function of Conditioned Meaning", Journal of Experimental Psychology, LXVI (1963), pp. 454-460; and Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, The Measurement of Meaning (Urbana, 1957), pp. 159-160.

[11]Theodore Clevenger, Jr. and Jack Matthews, The Speech Communication Process (Glenview, Illinois: Scott, Foresman and Company, 1971) p. 23.

This experimental study investigated the effects of message pitch and evaluative meaning on listeners' recall. In order to interpret the descriptions and results of this study, certain hypotheses and terms will be defined.

Hypotheses and Operational Definitions

Hypotheses:

H_1: Differences in message pitch significantly affect listeners' recall of message.

H_0: $A_1 = A_2 = A_3$

H_2: Evaluative meaning under different pitch treatments significantly affects recall.

H_0: $B_1 = B_2 = B_3$

Operational definitions:

Pitch - The highness or lowness of the voice; the number of times the vocal folds rise and fall in a second.

Duration - The amount of time a given syllable at a certain pitch level is produced

Inflection - Change in pitch.

Rising pitch - An inflection that proceeds significantly (at least one whole step) upward as measured on a musical scale.[12]

Falling pitch - An inflection that proceeds significantly (at least one whole step) downward as measured on a musical sclae.[13]

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[12]Bronstein and Jacoby, pp. 219-222.

[13]Bronstein and Jacoby, pp. 222-225.

Meaning - The attitude expressed towards an isolated word as measured on a semantic differential type scale.[14]

Recall - The ability to demonstrate the learning process by retaining certain information.

Procedures and Materials

The words selected for testing purposes were the result of a pre-test conducted to find subjects' attitude toward certain isolated words. From a study executed by Osgood,[15] 100 non-article words were selected to be evaluated for testing purposes.

Each word was arranged on a semantic differential type scale (100 in all, see Appendix A). The pre-test was administered to two Introduction to Speech-Communication classes. The subjects were instructed how to mark the scale and to give their first reactions to the words as related to degrees of "goodness" or "badness". A seven point semantic differential type scale was used on the pre-test and is exemplified below:

Word good___:___:___:___:___:___:___:bad
N

This type of scale was set up for each of the one hundred words. After the pre-test was completed by the subjects, numerical values were assigned to each point on the scale. The assigning of number values was to enable the words to be compared with one another.

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[14]Charles E. Osgood, Semantic Differential Technique (Chicago: Aldine Publishing Company, 1969).

[15]Osgood, p. 368.

Word good 1 : 2 : 3 : 4 : 5 : 6 : 7 :bad

Words in the (1,2,3) margin were interpreted as having been judged as "good" words. Words in the (5,6,7) margin or sector were interpreted as having been judged as "bad" words. Each word was examined separately. The positions on the scale marked by the subjects for a particular word were added and then divided by the number of subjects taking the pre-test. This enabled a mean, or average rating to be established for each word. In accordance with the semantic differential type scale set up for this particular pre-test, the words with a lower mean score were considered to have been judged better than the words with a higher mean score. It was by this method the words were ranked from "good" to "bad" (See Appendix B). For example:

Mother good 1 : 2 : 3 : 4 : 5 : 6 : 7 :bad
1.84 average

Punishment good 1 : 2 : 3 : 4 : 5 : 6 : 7 :bad
5.0 average

As seen by the preceeding example, because of the mean score, "mother" was judged to be better (on the good-bad scale) than "punishment", or "better" than any word whose mean was higher than 1.84. After the words had been ranked, an equal number of "good", "bad", and "neutral" words were selected in order to apply pitch treatments to them. In all, eighteen two-syllable words were selected. The words selected for the experiment are listed on the following page.

"Good"	"Neutral"	"Bad"
Laughter	Story	Poison
Mother	Thunder	Danger
Freedom	Wednesday	Hunger
Courage	Author	Anger
Knowledge	Power	Defeat
Progress	River	Battle

The selection of the eighteen words in the manner described was to insure equal representation of the evaluative meanings of words.

The subjects for the experiment were 48 students taken from the basic speech program at Central Missouri State College. Students were assigned to the basic speech program (Comm. 1000) by a random process. The only controls placed on the selection of the subjects were that the subjects be classified as Freshman (not having completed 30 hours of college credit before the start of that term), and the subjects were not suffering from a physical hearing problem. The selecting of Freshman was to provide a common educational experience level. Because of the random process of assigning students to the basic speech course, built in controls against selecting students of the same major, sex, and background, etc., were in effect.

The tapes were played to the subjects through the utilization of a language laboratory. The individual headsets and volume control devices provided good controls against noise distraction. The individual cubicles and desks protected against visual distractions. The master console allowed all three tapes to be played simultaneously.

The tapes were made by Dr. Glenn Q. Pierce, Professor of Communication. Rising pitch was based on the first syllable of the word given at Dr. Pierce's optimum range,[16] and the second syllable at least one step up on the musical scale. Falling pitch was based on the first syllable of the word given at optimum range, and the second syllable at least one step down on the musical scale. Level pitch was determined by repeating the optimum pitch for both syllables of the word.

The duration of the words on the tapes was 1/2 second with each syllable of the word lasting 1/4 second. The words were spoken five seconds apart.

Analysis

The tests were tabulated and analyzed in the following manner: A chi-square test was run to determine the difference in the frequency of occurance of subjects' recall of each word at the different pitch levels.[17]

Chi-square Model for each Word

	Presence on recall lists	Absence on recall lists
Rising pitch		
Level pitch		
Falling pitch		

[16]Bronstein and Jacoby, pp. 219-225.

[17]Sidney Siegel, Nonparametric Statistics (New York: McGraw-Hill Book Company, Inc., 1956) pp. 42-47.

For the experiment conducted, in order for the chi-square test to be considered significant at the .05 level, a value of 3.84 or more was necessary.

In addition, a three by three (3 X 3) analysis of variance[18] was run in order to determine the significance of the interaction between the different variables of pitch treatment and evaluative meaning. The results of the three by three analysis of variance was considered significant, at the .05 level, if a value of 3.14 or greater was achieved.

Model for 3 X 3 Analysis of Variance

	Rising pitch	Level pitch	Falling pitch
Positive Evaluative Meaning	Score equals number of words correctly recalled	#2	#3
Neutral Words	#4	#5	#6
Negative Evaluative Meaning	#7	#8	#9

Procedures

48 students from several 8:30 and 9:30 sections of Communication 1000 classes participated in this experiment. There were 24 participants in each of the two experimental sessions held in the language laboratory in

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[18] B.J. Winer, Statistical Principles in Experimental Design (New York: McGraw-Hill Book Company, 1962) pp. 412-418.

the Wood building. The two sessions were held at 9:00 a.m. and 10:00 a.m. of the same day. At each session the 24 subjects were divided randomly into three equal groups and each group heard one of the tapes.

As the students entered the language laboratory they selected any seat they wished. The master console was arranged so subjects sitting in seats 1-8 heard the Tape A arrangement of the words and pitch treatments; subjects sitting in seats 9-16 heard Tape B; subjects sitting at listening posts 17-24 heard Tape C. This procedure was repeated at the second session. After the students were seated they were instructed by the proctor to place the headsets over their ears. All the dial access and recording switches had been previously taped down to avoid accidental switching of channels once the tapes had started. The only dial left untaped was the volume control switch.

In addition to the 24 subjects (at each session) hearing the tapes, a proctor was assigned to each tape to make sure the material was being transmitted properly. All the instructions for the experiment were given over the headsets (See Appendix F) by the performer of the tape. As a safeguard against individual listening posts not functioning properly students were asked to raise their hands if they could hear the tape clearly and distinctly. Each proctor was in a position to see from his listening post if everyone in his group was receiving the message. During the course of the experimental sessions a total of 16 subjects heard Tape A, 16 subjects heard Tape B, and 16 subjects heard Tape C, for a total of 48 subjects divided into three equal groups.

The tapes consisted of four parts: the introduction, the experimental material, the recall assignment, and the conclusion.

The introduction served several functions. As previously stated it was a check to see that all the subjects were receiving the message. The introduction also served as time to allow the subjects to adapt to the voice of the performer of the tape and to adjust the headsets and volume to their comfort. Included in the introduction was the request for the removal of any chewing gum or candies from the mouth. Any chewing or sucking action could have possibly interfered with the hearing process.

The experimental materials were presented next. Each tape had all eighteen words treated with various inflections. The words were spoken at five second intervals for a total time of ninety seconds.

After the words were spoken, the recall assignment was given. The subjects were instructed to take the paper and pencil provided and to list as many of the words as they could remember. A time of 180 seconds was allowed for recall.

After the time elapsed the subjects were instructed to stop writing and to hand the paper to the proctor when he came around. In the "conclusion" portion of the tape the subjects were thanked for their cooperation. The subjects were then instructed to return the headsets to the desks and were dismissed.

The data used to see if message pitch and evaluative meaning affect listeners' recall was compiled from the recall lists of the 48 subjects.

Results

In order to see if there was any significant difference in the frequency of occurance at different pitch levels, a chi-square test was run on each word.

Table 1

Word and Meaning	Rising	Falling	Level	X^2	p
mother (G)	15	13	15	1.8	nsd
poison (B)	3	10	13	6.1	$>.05$
story (N)	6	9	4	2.1	nsd
author (N)	5	9	5	1.8	nsd
danger (B)	9	12	6	2.0	nsd
laughter (G)	7	10	8	0.7	nsd
defeat (B)	5	4	9	2.4	nsd
knowledge (G)	4	10	10	3.0	nsd
progress (G)	9	5	3	3.4	nsd
anger (B)	13	6	7	3.3	nsd
Wednesday (N)	7	9	10	0.6	nsd
battle (B)	5	7	6	0.3	nsd
hunger (B)	5	12	9	2.9	nsd
river (N)	10	14	7	3.1	nsd
thunder (N)	9	9	3	3.5	nsd
power (N)	5	12	11	3.0	nsd
courage (G)	9	5	5	1.7	nsd
freedom (G)	10	5	10	2.0	nsd

As demonstrated in Table 1, the chi-square test run on each word proved that there was no significant difference in the frequency of occurance at different pitch levels. In order to be considered significant at the .05 level, a chi-square value of 3.84 was required. In seventeen out of eighteen cases at the .05 level there was no significant difference. Based upon the chi-square analysis of the words there was no evidence to reject the null hypothesis that: H_0: $A_1 = A_2 = A_3$.

Evaluative meaning and its effect on recall was next to be examined. The general hypothesis predicted that evaluative meaning under different pitch treatments would significantly affect recall.

In order to test the effect of evaluative meaning on recall, a three by three analysis of variance[2] was run. This test determined the significance of the interaction of the different variables of pitch treatment and evaluative meaning.

Table 2

Summary Table of Recall Scores

	b_1 Rising	b_2 Falling	b_3 Level
a_1 good	54	48	51
a_2 bad	40	51	50
a_3 neutral	42	62	40

[1]Siegel, pp. 42-47

[2]Winer, pp. 412-418.

Table 3

Analysis of Variance Table
for Recall Scores as Affected by
Meaning and Pitch

Source	SS	d.f.	Ms	F	P
A: Meaning	4.00	2	2.00	0.19	nsd
B: Pitch	19.00	2	9.50	0.91	nsd
A X B	46.00	4	11.50	1.10	nsd
Error	472.00	45	10.49		
Total	541.00	53			

F_{95} (45,2) = 3.23

F_{95} (45,4) = 2.61

As demonstrated in Tables 2 and 3 the three by three analysis of variance proved there was no significant variation in the interaction of the variables of pitch and evaluative meaning. Table 3 shows the results of the effect of meaning on recall, pitch on recall, and the interaction of pitch and meaning. None of the variables proved to have a significant effect on recall at the .05 level.

Based upon the chi-square analysis of words and the three by three analysis of variance, there was no evidence to reject the null hypothesis that H_0: $B_1 = B_2 = B_3$.

CONCLUSIONS

The effects of message pitch and evaluative meaning on listeners' recall was examined in this study. The study was initiated after research in the field of speech had shown pitch and pre-conceived attitudes about meaning as important variables in message reception and comprehension.

Without exception, the pitch and evaluative meaning research reviewed referred to the message reception on the syntactical level. It was already established that certain pitch usages were indicative of certain understood meanings. For example, rising pitch has been shown to occur in inquisitive statements, and falling pitch has been evidenced in declarative statements. These pitch usages occured at the syntactical or content level. This study attempted to investigate the pitch and meaning factors. This was accomplished by isolating the variables at the morphemic level and testing the effects on learning and recall.

For this experiment the morphemic level referred to the smallest group of recognizable sounds produced to form meaning. The morphemes used were the 18 words selected for use in the tape portion of the experiment. It was necessary to use the lowest possible level of language to properly isolate pitch and meaning factors for testing purposes. What prompted this particular study was the lack of research in this area involving isolation and experimentation.

The first hypothesis tested was that differences in mesage pitch significantly affects receivers' recall of message. As stated previously, the message consisted of morphemes spoken at a periodic rate. The evaluative meaning towards the words used has been determined by a pre-test conducted prior to the experiment. The first portion of the analysis

showed whether rising, falling, or level pitch treatments affected recall of the message. Each word, or message unit, was presented at all three pitch treatments on one of the three tapes.

The test results of the experiment showed that in seventeen out of eighteen cases, it made no significant difference which pitch treatment was used. This meant that the words were recalled just as well at the rising inflection, as they were at the falling and level treatments. A total of 161 words were recalled at the falling pitch treatment, 141 words at the level pitch treatment and 136 words at the rising pitch treatment. The chi-square test on each word proved there was no significant difference and the overall totals were very consistent. Although the results were not significant at the .05 level, it is interesting to note that more words were recalled at the falling pitch treatment than at the rising pitch treatment or the level treatment. According to the standards set up for this experiment, it has been proven that pitch plays no significant role in the recall of messages at the morphemic level of language transmission and reception.

The second portion of the analysis tested the effect of evaluative meaning on recall and the interaction of meaning and pitch. The purpose of this portion of the experiment was to see if "good", "bad", or "neutral" words were recalled better at one pitch treatment or another. The results of the three by three analysis of variance test indicated that there was no significant difference between the recall of "good" words at the rising, falling and level pitch treatments; and no significant differences between the recall of "bad" words at the rising, falling and level pitch treatments; and no significant difference between the recall of "neutral" words at the rising, falling and level pitch treatments. Once again at the morphemic

level, it was proven that evaluative meaning does not significantly affect receivers' recall. 153 "good" words were recalled, 144 "neutral" words, and 141 "bad" words were recalled. In accordance with the standards set up for the statistical analysis of this experiment, evaluative meaning plays no significant role in the recall of messages at the morphemic level of message transmission and reception.

Summary

The use of message pitch and evaluative meaning plays no significant role in aiding or hindering the learning process as demonstrated by listeners' recall. Analyzing the pitch factor, it was concluded that neither rising, falling, nor level pitch affects recall at the morphemic level. In analyzing the evaluative meaning factor, it was concluded that "good", "bad", and "neutral" words were recalled equally as well at the morphemic level. Based upon the findings in this experiment, it would seem that the selection of pitch treatments or evaluative meaning of message units at the morphemic level will not play a significant role in the learning of those units.

Implications for Further Research

The study of what induces recall and learning has not been researched to any great lengths from the semantic point of view. The preceeding experiment attempted to research the phenomenon from one of the lower links in the chain of phonological structure, the morpheme.

Established researchers and scholars have already established the importance of pitch and evaluative meaning to message reception. The only drawback has been that the research has been done on the discoursive or

complete context level (speeches, etc.). The higher up the chain of phonological structures, the harder it is to isolate the variables for testing.

While this study suggested the testing of the effects of message pitch and evaluative meaning on the morphemic level and found no significant difference, it may prove valuable to conduct a study similar to this one the next link up in the chain of phonological structure. An implication for further research would be to test the effects of message pitch and evaluative meaning at the lowest syntactical level of word phrases. Perhaps by taking one link at a time the level at which message pitch and evaluative meaning affect listeners' recall may be discovered.

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APPENDIX A

Student Number_____Section_____

Directions: If you are very closely related to one end of the scale, you should place an "X" as follows:

good__X__:____:____:____:____:____:____:bad

or

good____:____:____:____:____:____:__X__:bad

If you are quite closely related to one side of the scale as opposed to the other, mark as follows:

good____:__X__:____:____:____:____:____:bad

or

good____:____:____:____:____:__X__:____:bad

If you are only slightly related, then mark as follows:

good____:____:__X__:____:____:____:____:bad

or

good____:____:____:____:__X__:____:____:bad

In some cases you may be neutral. Mark as follows:

good____:____:____:__X__:____:____:____:bad

Please work quickly. Your first impressions are most important. In addition, at the top of this page please record your student number and your section number in the appropriate places. Remember, these results are confidential and can in no way affect your grade in this course.

STAR

1. good____:____:____:____:____:____:____:

LUCK

2. good____:____:____:____:____:____:____:

CUP

3. good____:____:____:____:____:____:____:

SLEEP

4. good____:____:____:____:____:____:____:

ROPE

5. good____:____:____:____:____:____:____:

MAP

6. good____:____:____:____:____:____:____: bad

POISON

7. good____:____:____:____:____:____:____: bad

HEAD

8. good____:____:____:____:____:____:____: bad

DOG

9. good____:____:____:____:____:____:____: bad

HEART

10. good____:____:____:____:____:____:____: bad

SYMPATHY

11. good____:____:____:____:____:____:____: bad

HUSBAND

12. good____:____:____:____:____:____:____: bad

HUNGER

13. good____:____:____:____:____:____:____: bad

POWER

14. good____:____:____:____:____:____:____: bad

LIFE

15. good____:____:____:____:____:____:____: bad

GUILT

16. good____:____:____:____:____:____:____: bad

STONE

17. good____:____:____:____:____:____:____: bad

KNOT

18. good____:____:____:____:____:____:____: bad

WORK

19. good____:____:____:____:____:____:____: bad

MOTHER

20. good____:____:____:____:____:____:____: bad

MAN

21. good ____:____: ____:____:____:____:____: bad

CHAIR

22. good____:____:____:____:____:____:____: bad

PUNISHMENT

23. good____:____:____:____:____:____:____: bad

SUCCESS

24. good_____:_____:_____:_____:_____:_____:_____:bad

THIEF

25. good_____:_____:_____:_____:_____:_____:_____:bad

MEAT

26. good_____:_____:_____:_____:_____:_____:_____:bad

CAT

27. good_____:_____:_____:_____:_____:_____:_____:bad

EGG

28. good_____:_____:_____:_____:_____:_____:_____:bad

FRUIT

29. good_____:_____:_____:_____:_____:_____:_____:bad

BATTLE

30. good_____:_____:_____:_____:_____:_____:_____:bad

COLOR

31. good_____:_____:_____:_____:_____:_____:_____:bad

WIND

32. good_____:_____:_____:_____:_____:_____:_____:bad

MARRIAGE

33. good_____:_____:_____:_____:_____:_____:_____:bad

MOON

34. good_____:_____:_____:_____:_____:_____:_____:bad

PEACE

35. good_____:_____:_____:_____:_____:_____:_____:bad

FUTURE

36. good_____:_____:_____:_____:_____:_____:_____:bad

COURAGE

37. good_____:_____:_____:_____:_____:_____:_____:bad

FOOD

38. good_____:_____:_____:_____:_____:_____:_____:bad

FRIEND

39. good_____:_____:_____:_____:_____:_____:_____:bad

FATHER

40. good_____:_____:_____:_____:_____:_____:_____:bad

FISH

41. good_____:_____:_____:_____:_____:_____:_____:bad

WOMAN

42. good____:____:____:____:____:____:____:bad

DOCTOR

43. good ____:____:____:____:____:____:____:bad

MONEY

44. good:____::____:____:____:____:____:____:bad

LAUGHTER

45. good____:____:____:____:____:____:____:bad

BREAD

46. good____:____:____:____:____:____:____:bad

BIRD

47. good____:____:____:____:____:____:____:bad

TONGUE

48. good____:____:____:____:____:____:____:bad

ANGER

49. good____:____:____:____:____:____:____:bad

FREEDOM

50. good____:____:____:____:____:____:____:bad

RAIN

51. good____:____:____:____:____:____:____:bad

WEDNESDAY

52. good____:____:____:____:____:____:____:bad

HAIR

53. good____:____:____:____:____:____:____:bad

PLEASURE

54. good____:____:____:____:____:____:____:bad

TRUTH

55. good____:____:____:____:____:____:____:bad

WINDOW

56. good____:____:____:____:____:____:____:bad

DEFEAT

57. good____:____:____:____:____:____:____:bad

PURPOSE

58. good____:____:____:____:____:____:____:bad

NOISE

59. good____:____:____:____:____:____:____:bad

HOUSE

60. good____:____:____:____:____:____:____:bad

POLICEMAN

61. good____:____:____:____:____:____:____:bad

LOVE

62. good____:____:____:____:____:____:____:bad

WEALTH

63. good____:____:____:____:____:____:____:bad

HORSE

64. good____:____:____:____:____:____:____:bad

SNAKE

65. good____:____:____:____:____:____:____:bad

RESPECT

66. good____:____:____:____:____:____:____:bad

SMOKE

67. good____:____:____:____:____:____:____:bad

MUSIC

68. good____:____:____:____:____:____:____:bad

CRIME

69. good____:____:____:____:____:____:____:bad

EAR

70. good____:____:____:____:____:____:____:bad

RIVER

71. good____:____:____:____:____:____:____:bad

AUTHOR

72. good____:____:____:____:____:____:____:bad

WATER

73. good____:____:____:____:____:____:____:bad

GIRL

74. good____:____:____:____:____:____:____:bad

SEED

75. good____:____:____:____:____:____:____:bad

HOPE

76. good____:____:____:____:____:____:____:bad

PROGRESS

77. good____:____:____:____:____:____:____:bad

GAME

78. good____:____:____:____:____:____:____:bad

FEAR

79. good____:____:____:____:____:____:____:bad

CLOUD

80. good____:____:____:____:____:____:____:bad

TRUST

81. good____:____:____:____:____:____:____:bad

HAND

82. good____:____:____:____:____:____:____:bad

KNOWLEDGE

83. good____:____:____:____:____:____:____:bad

SUN

84. good____:____:____:____:____:____:____:bad

DANGER

85. good____:____:____:____:____:____:____:bad

HEAT

86. good____:____:____:____:____:____:____:bad

STORY

87. good____:____:____:____:____:____:____:bad

DEATH

88. good____:____:____:____:____:____:____:bad

PAIN

89. good____:____:____:____:____:____:____:bad

CHOICE

90. good____:____:____:____:____:____:____:bad

NEED

91. good____:____:____:____:____:____:____:bad

FIRE

92. good____:____:____:____:____:____:____:bad

TREE

93. good____:____:____:____:____:____:____:bad

TOOTH

94. good____:____:____:____:____:____:____:bad

PICTURE

95. good_____:_____:_____:_____:_____:_____:_____:bad

BOOK

96. good_____:_____:_____:_____:_____:_____:_____:bad

ROOT

97. good_____:_____:_____:_____:_____:_____:_____:bad

BELIEF

98. good_____:_____:_____:_____:_____:_____:_____:bad

THUNDER

99. good_____:_____:_____:_____:_____:_____:_____:bad

LAKE

100. good_____:_____:_____:_____:_____:_____:_____:bad

APPENDIX B

WORDS RANKED - GOOD TO BAD BY MEAN

1.	Love	1.53	51.	Horse	3.18
2.	Truth	1.65	52.	River	3.22
3.	Friend	1.66	53.	Head	3.33
4.	Peace	1.66	54.	Choice	3.33
5.	Sleep	1.67	55.	House	3.35
6.	Laughter	1.83	56.	Bread	3.39
7.	Mother	1.84	57.	Window	3.41
8.	Freedom	1.88	58.	Bird	3.44
9.	Hope	1.94	59.	Girl	3.44
10.	Courage	2.00	60.	Seed	3.44
11.	Woman	2.06	61.	Tooth	3.44
12.	Heart	2.11	62.	Egg	3.44
13.	Life	2.11	63.	Work	3.50
14.	Trust	2.11	64.	Policeman	3.53
15.	Success	2.16	65.	Game	3.56
16.	Knowledge	2.17	66.	Need	3.56
17.	Progress	2.17	67.	Hand	3.61
18.	Pleasure	2.17	68.	Root	3.61
19.	Luck	2.17	69.	Author	3.61
20.	Respect	2.18	70.	Power	3.67
21.	Marriage	2.28	71.	Cloud	3.67
22.	Man	2.28	72.	Tongue	3.78
23.	Money	2.33	73.	Rain	3.82
24.	Belief	2.39	74.	Rope	3.83
25.	Father	2.39	75.	Story	3.83
26.	Water	2.44	76.	Ear	3.89
27.	Wealth	2.53	77.	Stone	3.89
28.	Doctor	2.56	78.	Knot	3.94
29.	Lake	2.56	79.	Chair	4.00
30.	Sympathy	2.56	80.	Thunder	4.00
31.	Music	2.59	81.	Cup	4.11
32.	Food	2.61	82.	Cat	4.22
33.	Sun	2.67	83.	Wednesday	4.29
34.	Husband	2.72	84.	Battle	4.50
35.	Fruit	2.72	85.	Snake	4.71
36.	Meat	2.78	86.	Anger	4.71
37.	Dog	2.78	87.	Noise	4.82
38.	Moon	2.83	88.	Smoke	4.82
39.	Star	2.83	89.	Guilt	4.83
40.	Purpose	2.88	90.	Fire	4.94
41.	Future	2.94	91.	Punishment	5.00
42.	Map	2.94	92.	Hunger	5.17
43.	Book	2.94	93.	Danger	5.22
44.	Tree	2.94	94.	Poison	5.33
45.	Color	3.06	95.	Fear	5.33
46.	Fish	3.11	96.	Defeat	5.33
47.	Picture	3.11	97.	Death	5.44
48.	Hair	3.12	98.	Thief	5.50
49.	Wind	3.17	99.	Crime	5.83
50.	Heat	3.17	100.	Pain	6.00

APPENDIX C

SCRIPT OF TAPE FOR GROUP I

Word	Correct Pronounciation	Pitch Treatment
poison(B)	poiz-ən	→
story(N)	'stor-ē	↓
author(N)	'o-thər	↓
danger(B)	'dan-jər	↓
mother(G)	'm th-ər	→
laughter(G)	'laf-tər	↑
defeat(B)	di-'fēt	↓
knowledge(G)	'nal-ij	↓
progress(G)	präg-rəs	→
anger(B)	'an-gər	→
wednesday	'wenz-dē	→
battle	'bat-əl	↑
hunger(B)	'hən-gər	↑
river(N)	'riv-ər	→
thunder(N)	'thən-dər	↑
power(N)	'pau(-ə)r	↑
courage(G)	'kər̄-ij	↑
freedom(G)	'frēd-əm	↓

APPENDIX D

SCRIPT OF TAPE FOR GROUP II

Word	Correct Pronounciation	Pitch Treatment
power(N)	'pau(-ə)r	→
river(N)	'riv-ər	↓
battle(B)	'bat-əl	→
hunger(B)	'hən-gər	→
poison(B)	poiz-ən	↓
laughter(G)	'laf-tər	→
story(N)	'stor-ē	↑
author(N)	'o-thər	↑
freedom(G)	'frēd-əm	↑
mother(G)	'məth-ər	↓
danger(B)	'dān-jər	↑
anger(B)	'an-gər	↓
progress(G)	präg-rəs	↓
knowledge(G)	'nal-ij	↑
courage(G)	'kər-ij	→
wednesday(N)	'wenz-dē	↓
thunder(N)	'thən-dər	→
defeat(B)	di-'fēt	↑

APPENDIX E

SCRIPT OF TAPE FOR GROUP III

Word	Correct Pronounciation	Pitch Treatment
laughter(G)	'laf-tər	↓
power(N)	'pau(-ə)r	↓
anger(B)	'an-gər	↑
defeat(B)	di-'fēt	→
knowledge(G)	'nal-ij	→
thunder(N)	'thən-dər	↓
river(N)	'riv-ər	↑
danger(B)	'dān-jər	→
battle(B)	'bat-əl	↓
poison(B)	poiz-ən	↑
mother(G)	'məth-ər	↑
freedom(G)	'frēd-əm	→
story(N)	'stor-ē	→
Wednesday(N)	'wenz-dē	↑
author(N)	'o-thər	→
progress(G)	präg-rəs	↑
courage(G)	'kər-ij	↓
hunger(B)	'həŋ-gər	↓

APPENDIX F

SCRIPT OF INTRODUCTION TO TAPES FOR ALL GROUPS

Introduction: (Given on tape over headset hookup)

Good morning. As I am talking to you during this introduction would you please take this time to adjust the volume and the headsets to your comfort, and to remove any chewing gum or candies that you may have in your mouth. Thank you for participating in our study. At this time, will all of you who can hear the sound of my voice clearly and distinctly, raise your hand and keep it up until instructed to lower it. (Pause five (5) seconds to allow proctors to check that every subject is receiving the message) Please lower your hands. On the desk in front of you, you will notice a pencil and a sheet of paper. Please do not touch these items until instructed to do so. In about one minute you will be hearing some information at a periodic rate. At the conclusion of the tape you will be asked to write certain information based on what you hear on the tape. The written part of this experiment will in no way affect your grade in Communication 1000, so please relax, and in a few seconds we will start.

[For the next ninety (90) seconds the individual tapes were played to the three groups]

[After the tapes were played, everyone heard the following]

You have just heard a series of non-related words. At this time will you please take the pencil and paper in front of you, and list in any order all the words you can remember that you have just heard on the tape. Please begin now.

[Pause of 180 seconds to allow subjects to recall]

Conclusion:

Please stop writing. Please hand the pencil and paper to the proctor when he comes around. If you are interested, a description and the results of the experiment you have just participated in will be available later this term. At this time I would like to thank you for your cooperation, and after you return the headsets to the desk, you are free to leave.